Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ponding in time with the period of the greatest continental elevation, during which period the glaciers would naturally flow in the direction of the lowest plane of their excavations, finding their outlets accordingly. The work of excavation being completed, then comes a continental subsidence, the "lower drift period," during which the narrower channels of excavation are completely filled, and the larger ones partially. Then comes another continental elevation, not so great, however, as the first; this is the "old channel" period, during which the great lakes take form as such for the first time, and all those "old drift channels" were excavated by running water and floating icebergs. Then comes another continental subsidence, much greater than the first or "lower drift period;" this is the upper drift period, during which those "old channels" are completely filled, and the surface elevated above them from one to two hundred feet, and even more. Then comes another continental elevation, the beginning of the present status of appearances. — L. J. STROOP, *Waxahachie, Ellis County, Texas.*

◆

MICROSCOPY.

AMERICAN MICROSCOPES. — The able refutation by your correspondent, C. S., in your issue of September, of the statements made by Dr. Hagen, with respect to American microscopes, cannot but have been read with gratification by all interested in the question. It is a fact much to be deplored, that in scientific questions — of all others — national vanity and prejudices should so far warp the judgment of otherwise very competent writers, as to drive them to the most obviously, to use Dr. Hagen's own mild epithet, "comical" conclusions.

Referring to German stands, for whose glorification Dr. Hagen seems to have written the papers in question, any one who, like myself, has had the opportunity of visiting the workshops of nearly all the most celebrated manufacturing opticians of Europe, will say that stands of continental manufacture, be they French or German, are sadly deficient in those improvements and appliances constituting a first class working English or American instrument. From this statement I except neither Mertz of Munich, nor Hartnack of Paris. Nachet, from the latter city, is the only maker whose instruments, in any way approach the perfection of either English or American stands. This deficiency in appliances and working means, in continental instruments, will be readily understood, when I mention that when I remonstrated upon the deficiency of stage motion in his best first class stands, Hartnack answered me: "Well, I see that you go for those English or American instruments looking like a steam engine, with screws, levers, and milled heads in every direction; *we do not believe in such toys here.*" As to the upright vertical model, it speaks for, or rather against itself, as anybody knows that has ever used one of them; and still it is, to this day, the favored pattern adopted by students throughout France and Germany.

About objectives and eye pieces, I have nothing to say in addition to what C. S. has so ably discussed in his paper; unless I venture to remind Dr. Hagen that the wonderful performance of one given glass in the hands of one observer, often proves an utter failure in the hands of another, though both acknowledged "adepts" in the use of the microscope. This undisputed fact should make one very careful before pronouncing *ex cathedra* upon the merits of objectives produced by artists of unquestioned ability. In connection with this last remark, allow me to state that I shall be most happy to show to Dr. Hagen the *Surirella gemma* and its markings, which he only saw dimly with a 1-10th inch objective of Tolles; to show him, with a 1-8th inch immersion lens of W. Wales, the "basket work," as we call the elongated hexagons of that fine test at the Bailey Club, as near to Hartnack's theoretical diagram, as it is practicable to accomplish in a microscope view of that diatom. This very same 1-8th inch glass failed completely to show any markings on the *Surirella* in the hands of Hartnack, who, after having shown me the faintest display of the lines in question with his No. 11—almost equal to the 1-15th of our makers—pronounced my poor 1-8th an "inferior glass," which, "as long as I lived, would never resolve the *Surirella gemma*." So much for hasty judgments. The determination of the abstract, as well as relative merits of objectives, must stand, in the opinion of all experienced microscopists, when one considers the many details of manipulation which cannot fail to influence their performance, as one of the most perplexing and difficult problems to settle in practical optics.

Although not having the right to claim thirty years experience in the use of the microscope, and although one of the most insignificant *dilettantis* in the realm of microscopy, I venture to bring to bear my humble testimony, and some little experience gained in long European peregrinations, in favor of the superiority of English and American instruments, for both their mechanical and optical excellence, over all continental productions in the same line, begging here to mention, that in my statements I am influenced by no national prejudices, as I do not belong by birth, to either of the two aforesaid nationalities; neither am I a member of the Boston Optical Association.—T. O., *Cornwall Landing, Sept.* 16, 1870.

WALES' LOW POWER OBJECTIVES.*—May I ask of you the favor of a few lines in reply to Mr. Bicknell's note in the NATURALIST for June last. Mr. Bicknell agrees with me in according to Mr. Wales' objectives the high rank to which they are undoubtedly entitled, but in some way seems to have overlooked what the communication was intended to set forth before the microscopic world. It was not that Mr. Wales' 4-10 had an amplification of two hundred and ten diameters, or that Mr. Wales' did or did not underrate his lenses in the naming of them. The point really presented was, that lenses of such low power should do so much, there not being any great liability of material difference in the amplification present in objectives of such low power as 3-inch. No measurement of its power was given. Not so, however, in the case of the 4-10, for as is well known, and as Mr. Bicknell states, objectives of various makers rating the same, differ greatly in their magnifying power. And this again occurs, not only with the objectives of different makers, but even the objectives of the same maker differ, although rated the same, *e. g.* in R. & I. Beck's Catalogue, 1868, are advertised 1-4 inch objective (No. 234) magnifying power two hundred and ten, and on a succeeding page 1-4 inch objectives (No. 296) magnifying power one hundred and forty diameters. Therefore I gave the amplification used, and such being known, it would in reality be immaterial what the objective might be called. In fact the succeeding paragraph distinctly states "that with no equal power of Powell & Leland's of London, of Hartnack of Paris, of Tolles and Grunow of this country, or of Gundlach of Vienna, various objectives of each and all of which makers I have examined, have either I myself, or other microscopists of my acquaintance, been able to effect this."

---

*This reply, with a number of other articles, has been unavoidably postponed on account of the space devoted to the reports of the meeting of the American Association.—EDS.

I do not say with a 4-10 objective, for firstly, they all differ in their amounts of amplification, and secondly, neither Hartnack nor Gundlach thus denominate their objectives, but as usual with Continental makers, number them as 1, 2, 3, and so on. The word power, however, I thought could not be misunderstood, such equality of power being most easily attained by the use of the draw-tube.

That an objective magnifying two hundred and ten diameters when used in connection with a No. 1 or an A eye-piece, should resolve the *Pleurosigna angulatum*, mounted, not dry, but in balsam, and by direct light, instead of oblique, is what I wished to put on record, and such I think the generality of microscopists would infer on perusal of the article. As, however, Mr. Editor, Mr. Bicknell is of the opinion that I have made an error in my measurements of the amplification, and as the liability of error is less when the testimony of many witnesses are concurrent, I would state that not only have I myself remeasured the amplification present on the use of said objective in said resolution, but that I am permitted to use the names of Dr. Edward Curtis, formerly of the Army Medical Museum, Washington, D. C.; of Mr. Joseph W. Ward, the well known microscopist of this city; and of Mr. O. G. Mason, Photographer of Bellevue Hospital, names familiar to all microscopists in New York, in testimony of the correctness of said measurement.

As regards the second point raised, namely, the underrating of objectives by their various makers, it is, undoubtedly, the fact, not however I think from any intention to mislead, but rather from an inherent want or defect in the nomenclature in use. The denominating of an objective a 4-10, 1-5, 1-8 and so on, answers a certain purpose of informing us of about what power is meant, but if, in addition, the makers would engrave upon their objectives the amplification present when the image formed by such objective is thrown upon a screen at the recognized normal distance of ten inches (or 254 millimeters) from the object we should then have something definite. The mode which I find most convenient for obtaining this amplification of the objective considered in and by itself is as follows: An image of the lines or divisions of a stage micrometer is caused to fall upon the eye-piece micrometer of the micrometer eye-piece —the collective or field glass of the same having been previously removed. The plane or distance from the stage micrometer at which the eye-piece micrometer should be placed, namely, ten inches, may easily be effected by means of the draw tube. By comparison of the lines of the stage micrometer as thus projected, with those of the eye-piece micrometer the amplification of the objective is readily determined; the eye glass of the eye-piece enlarging both sets of lines equally, and greatly facilitating the reading. In this use of the eye-piece micrometer it is necessary that the exact value of its scale should be known, a point unimportant when otherwise used. The scales upon the micrometers which I use and find in general best adapted to the purpose, are a millimetre divided into 1-100 for the stage micrometer, and a centimetre divided into 1-100 for the ocular or eye-piece micrometer.

With the highest respect and kindliest of feelings towards Mr. Bicknell, who has contributed so largely to the advancement of microscopic science in America, I intended in my original communication, not the bringing before the public the superior excellence of Mr. Wales' lenses, for of their merit in this country we are all agreed, but to place on record certain resolutions as attained by exceedingly low amplification. — J. J. HIGGINS, M. D.

THE SIMPLEST FORM OF MICRO-TELESCOPE. — At a field meeting of the Albany Institute, held in Hoosic Falls, on the 24th of September, Dr. R. H. Ward of Troy, N. Y., exhibited a simpler form of micro-telescope than has hitherto been proposed. He screws an ordinary 4-inch objective (5-8 inch wide, 2 3-4 inches solar focus) into an adapter (about 2 inches long) below the stage of the "seaside," "clinical," or any other hand-microscope. To this object-glass the compound body, with all its lenses, acts as an erecting eye-piece, as in Tolles' telescope and Curtis' micro-telescope. Of course, no one would expect from a 5-8-inch opening the light of a 1-inch opening; but the new arrangement gives a really useful field-telescope without requiring a single addition to the microscopist's apparatus. Solid (single combination) objectives act best as erectors in this case, but the ordinary objectives, from 2-inch to 1-2-inch, answer very well. The same arrangement, by raising the tube considerably, and perhaps substituting a 1-inch objective for the 4-inch, furnishes an erecting compound microscope which is excellent as a hand-magnifier for field use; and by removing the lens below the stage we have the ordinary field microscope on which the object may be placed in the "clinical compressor," or otherwise.